



DISTRICT OF COLUMBIA TRANSIT IMPROVEMENTS ALTERNATIVES ANALYSIS

NEED ASSESSMENT

JUNE 2004

DISTRICT OF COLUMBIA DEPARTMENT OF TRANSPORTATION
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY



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1.0 INTRODUCTION

The District of Columbia Transit Alternatives Analysis is a study of transportation, development and community needs within the District of Columbia. The study is being conducted in accordance with Federal Transit Administration (FTA) guidelines for identifying, evaluating, and selecting needed transportation improvements to support local mobility, accessibility, and economic development goals as well as to connect healthy, vibrant communities. Recommended improvements will enhance mobility within city neighborhoods, provide enhanced access to existing transit service and leverage existing transit infrastructure by extending the reach of the system and alleviating capacity constraints.

The Transit Alternatives Analysis is being conducted by the Washington Metropolitan Area Transit Authority (WMATA) on behalf of the District of Columbia and consists of four distinct components:

- *Needs Assessment*, which reviews the District's demographic, transportation and land use conditions and uses these as the basis for identifying system-wide transit improvement needs;
- *Alternatives Definition*, which describes the alternative approaches for addressing the needs identified in the needs assessment;
- *Challenges and Benefits*, which reviews the opportunities and issues for further study and the required coordination associated with each of the alternatives under consideration; and
- *Solutions and Implementation*, which recommends the funding, phasing, and operational plans and parameters for the selected alternatives.

This report represents the Needs Assessment. The other components will be completed as the Transit Alternatives Analysis progresses.

1.1 NEEDS ASSESSMENT – DOCUMENT PURPOSE

As noted above, this document is the first of four that will be completed during the course of the District of Columbia Transit Alternatives Analysis. The purpose of the Needs Assessment is to identify areas of the District of Columbia that require transit improvements to enhance access within and between neighborhoods, to improve access to key activity centers within the District, and to improve access to the regional Metro rail system. Five specific technical analyses were completed to identify these needed improvements:

- An assessment of transit travel times to employment and other activity centers for District residents;
- An assessment of overall travel and transit demand in different sections of the city;
- A comparison of transit demand to transit capacity within key corridors in the city;
- An assessment of development and redevelopment initiatives within the city that will require transit access; and
- An assessment of public preferences for transit improvements.

The analyses included in this document were completed within the context of the project's goals and objectives (outlined in Section 1.2) and past studies related to transit improvements in the city (outlined in Section 1.3). The analysis also reflects current transportation and demographic conditions in the city as well as forecasted future conditions.

The structure of the document is as follows:

- **Introduction** – introduces the project and the Needs Assessment, including the project goals and objectives and planning context, with a specific focus on the results of relevant past studies.
- **Current and Forecasted Future Conditions** – focuses on presenting the current and forecasted future transportation and demographic characteristics of the District of Columbia.
- **Needs Analysis** – focuses on identifying transit needs based on travel and transit demand, transit travel times, a comparison of transit demand to transit capacity, development and redevelopment initiatives, and public preferences for transit improvements.
- **Statement of Needs** – focuses on identifying the transit needs of the District of Columbia based on the analysis completed in previous sections.
- **Corridor Recommendations** – outlines the corridors with the greatest transit improvement needs based on the analyses outlined above. These corridors will then become the foundation for completing the next steps of the District of Columbia Transit Alternatives Analysis

1.2 GOALS AND OBJECTIVES

This Needs Assessment is being conducted in order to compare the District's existing transportation and demographic conditions to the community's visions, expectations and needs for a future transportation system. These needs, visions and expectations, articulated during a variety of public involvement activities, scoping meetings and focus groups, have been translated into a set of Project goals and objectives. By comparing the District's existing conditions to the project goals and objectives, gaps between the existing transportation network and the needs of the community it serves have been identified. The goals and objectives guiding the analysis are outlined below.

Goal: Access and Mobility

Objectives:

1. Increase neighborhood and activity center connectivity.
2. Improve access to regional centers.
3. Improve market demands.

Goal: Community and Economic Development

Objectives:

1. Support community development initiatives.
2. Enhance development benefits.

Goal: System Performance

Objectives:

1. Increase capacity.
2. Enhance efficiency and cost effectiveness.

Goal: Environmental Quality

Objectives:

1. Limit adverse impacts.
2. Support environmental benefits.

1.3 TRANSPORTATION PLANNING CONTEXT

Within the District of Columbia, transportation needs are identified and addressed by the District Department of Transportation, often working cooperatively with the Washington Metropolitan Area Transit Authority (WMATA) and the Metropolitan Washington Council of Governments (MWCOG) to identify appropriate transportation solutions and investments. The District of Columbia Transit Alternatives Analysis is the most recent of several studies that have been commissioned to identify potential solutions to the current transportation challenges that face the District. Specifically, prior plans that are supporting the District's current transportation planning process include:

- The District's 1997 *Vision, Strategy and Action Plan*, which recommended creating intra-city connections between the radial WMATA rail lines by designating ten corridors for transit improvements that would connect District neighborhoods and help support community economic development initiatives.
- WMATA's 1999 *Transit Service Expansion Plan*, which advanced five corridors for further study.
- WMATA's 2001 *Core Capacity Study*, which identified systemwide rail improvements that will allow the system to accommodate estimated future ridership.
- WMATA's 2001 *Transit Development Study*, which considered each of the previously-identified corridors for surface rail transit and recommended four priority corridors for implementation.
- WMATA's 2003 *Regional Bus Study*, which identified bus improvements to serve inside previously-designated corridors and to aid in District circulation and Metrorail system capacity relief.

Even more recently, transportation solutions have been coordinated with District of Columbia land use and redevelopment initiatives. Through cooperation with the District Office of Planning,

transportation plans and projects are expected to support community development initiatives articulated in the District's Comprehensive Plan, and the Strategic Neighborhood Action Plans submitted by the Advisory Neighborhood Commissions each year. Coordination between the Office of Planning and the District Department of Transportation is intended to maximize the effectiveness of transportation and land use investments to their mutual benefit.

At the outset, the District of Columbia Transit Alternatives Analysis sought to merge the recommendations from prior planning efforts as well as expand the criteria used to select the priority corridors for transit investment. However, through a series of public involvement efforts, additional mobility and community needs were identified. Therefore, the District and WMATA are considering a wider range of future transit improvements than had been most recently recommended in the 2001 Transit Development Study. Because of the agencies' strong emphasis on coordinating their objectives to implement mutually beneficial projects, the Needs Assessment has expanded the scope of previous studies and has examined the District's current transportation system as a whole.

2.0 EXISTING AND FUTURE FORECASTED CONDITIONS

This section of the Needs Assessment outlines the current and future forecasted transportation and demographic conditions that exist in the District of Columbia. Fully understanding these conditions is essential because they provide the context in which planning for needed transportation improvements will occur. Specifically, this section provides an understanding of current and future forecasted conditions relative to:

- Traffic
- The Transit System
- Population and Employment; and
- Special Trip Generators and Activity Centers

More detail on each of these areas is provided below.

2.1 TRAFFIC CONDITIONS

The basic street network of the District has not changed significantly since L'Enfant developed his plans in 1791. The general pattern is one of a basic north-south/east-west grid, overlaid with a radial pattern of avenues which act as gateways to the City from the surrounding areas of Maryland. Connections into Virginia are limited to five crossings over the Potomac River, all but one of which is located near the center of the city.

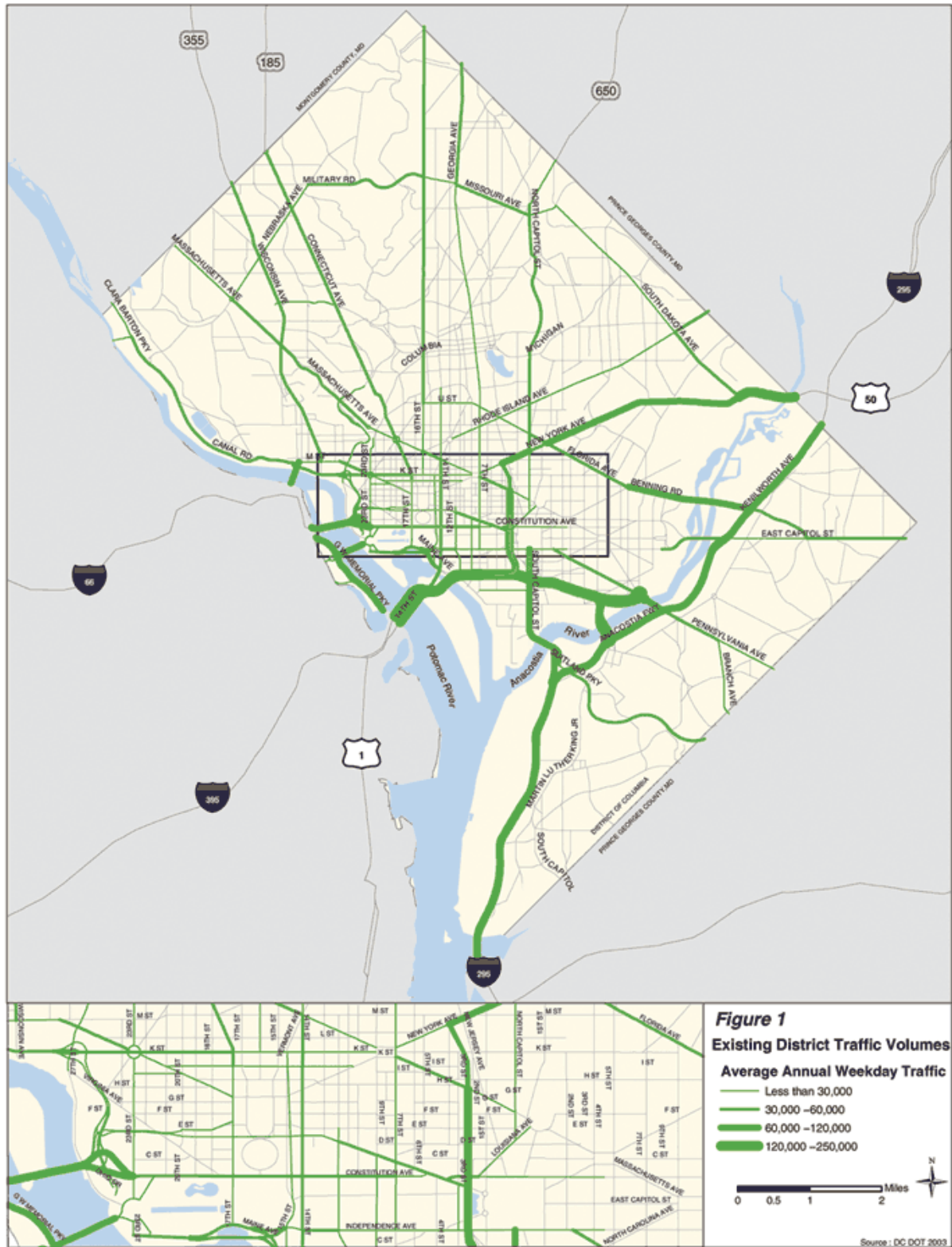
Internal circulation within the District is facilitated by the grid of lettered and numbered streets; however, three major geographic features disrupt this pattern. In the northwest, Rock Creek Park limits east-west movement north of Connecticut Avenue. At the center of the city, the National Mall creates breaks in the grid. Traffic on streets which terminate at the Mall must divert onto other north-south facilities and the associated turn movements add to the congestion in downtown. In the southeast, the Anacostia River limits connections to the rest of the city, thus resulting in traffic congestion at river crossings.

Figure 1 illustrates traffic volumes on major streets and highways within the District. The flow of traffic is greatly influenced by north-south movements along the I-95 corridor feeding into I-295 and I-395. These highways carry the heaviest daily traffic volumes in the District (an average of approximately 193,000 daily trips on I-295 and 80,000 on I-395.) In addition, the limited number of crossings over the Potomac and Anacostia rivers generate higher volumes of traffic at these gateways than their counterparts in the northern portion of the District. Examples of heavy volumes from the south include 93,000 daily trips across the Anacostia River on the Pennsylvania Avenue Bridge, 63,900 trips across the Potomac on the Key Bridge, and 100,000 trips across the Theodore Roosevelt Bridge, also over the Potomac. These volumes can be contrasted with volumes coming

into the city from the north, which include 41,000 daily trips on Connecticut Avenue, 18,000 daily trips on Georgia Avenue, and 37,000 daily trips on North Capitol Street.

In general, even the smaller volumes coming from the north are significant and show the need for viable alternative means of transportation in the city as demand will continue to grow.

Figure 1
Existing District Traffic Volumes



2.2 TRANSIT CONDITIONS

The District has capitalized on its transit-friendly attributes and, in partnership with WMATA, has developed a high-quality transit network comprised of bus and rail services. The mix of services available to District residents is shown on Figure 2. Although this mix of services varies in different areas of the City, the system has been essential in helping the District handle everyday travel needs as well as the demands of federal events, annual festivals, and other special events unique to the nation's capital. To help combat growing automobile congestion, the WMATA Board has set a goal of doubling transit ridership by 2025. Also by 2025, the Metropolitan Washington Council of Governments is forecasting that the region's population will grow by 30%. Currently, less than 4% of the region's daily trips are made on transit. By contrast, 40% of the District's trips are currently made on transit. Table 1 provides a more detailed overview of transit use in the District, compared to the region.

Table 1
Regional and District Transit Use

Description	Transit* Mode Share	Total Trips
TOTAL Regional trips		25,796,740
TOTAL District trips		2,039,556
OVERALL Regional transit mode share	3.7%	
OVERALL District transit mode share	40%	
All regional trips finishing in the District core	25%	442,620
All regional trips finishing in the District, outside the core	15%	1,596,936
Trips starting and finishing within the District Core	29%	156,197
District trips starting in the core, and ending outside the core	21%	101,254
District trips starting outside the core and ending inside the core	36%	348,236
District trips starting outside the core and ending outside the core	10%	755,569

Source: 2005 Weekday Trips, MWCOG Model, version 6.3

*Note: Transit includes all transit modes and is not specific to transit mode or service provider.

As the data in Table 1 show, transit use decreases away from the District core. For example, even in the District, where 40% of the trips are made by transit, only 10% of the trips made outside the core utilize transit. Chapter 3 provides a more detailed description of District transit markets and trip patterns. The following sections provide an overview of WMATA transit services, with a specific focus on service within the District.

Figure 2
Existing Transit Services



Metrorail

The Metrorail system is the culmination of a well-executed long range plan for regional transit service. Developed out of a 1969 plan for 98 miles of rail, the system has been successfully implemented to its current size of five lines, 83 stations, and 103 miles of track. The system has provided the District with direct, convenient connections to activity centers in Maryland and Virginia, and has served as an exemplar for how high-capacity transit can be used to encourage and control redevelopment in both urban and suburban locations. Table 2 illustrates the ridership trends of the Metrorail system between 1990 and 2000.

Table 2
Metrorail Service, 1990-2000

	Passenger Car Revenue Miles	Passenger Car Revenue Hours	Passenger Boarding, Including Transfers	Average Weekday Boardings
FY 1990	33,278,502	1,481,500	182,005,851	498,646
FY 1995	41,574,608	1,630,189	198,380,074	543,507
FY 2000	48,243,553	2,260,586	218,273,257	598,009

Source: WMATA, Office of Business Planning and Project Development.

Metrorail system boardings have increased by 19% between 1990 and 2000. During that same period, population in the region has increased by 17%. Demand for Metrorail services is expected to continue to grow at a steady pace, but without additional service capacity, overcrowded conditions will prevent the ability to handle future ridership growth. Table 3 illustrates the capacity and crowding consequences of increasing ridership without concurrent increases in passenger capacity.

Table 3
Metrorail Vehicle Loading at Maximum Load Points, 2005-2010

Line	Passenger Capacity	Passenger Demand	Capacity Utilization	2005	2006	2007	2008	2009	2010
Red	17,760	15,000	84%	87%	89%	91%	94%	96%	99%
Blue	6,720	5,890	88%	90%	92%	95%	98%	100%	103%
Orange	12,720	10,900	86%	88%	90%	93%	95%	98%	101%
Yellow	6,480	5,670	88%	90%	92%	95%	97%	100%	103%
Green	8,640	7,460	86%	89%	91%	94%	96%	99%	101%

Source: WMATA, Office of Business Planning and Project Development

Note: Utilization conditions above 85% are considered to be highly congested conditions. Passengers can no longer board crowded trains above 100% utilization.

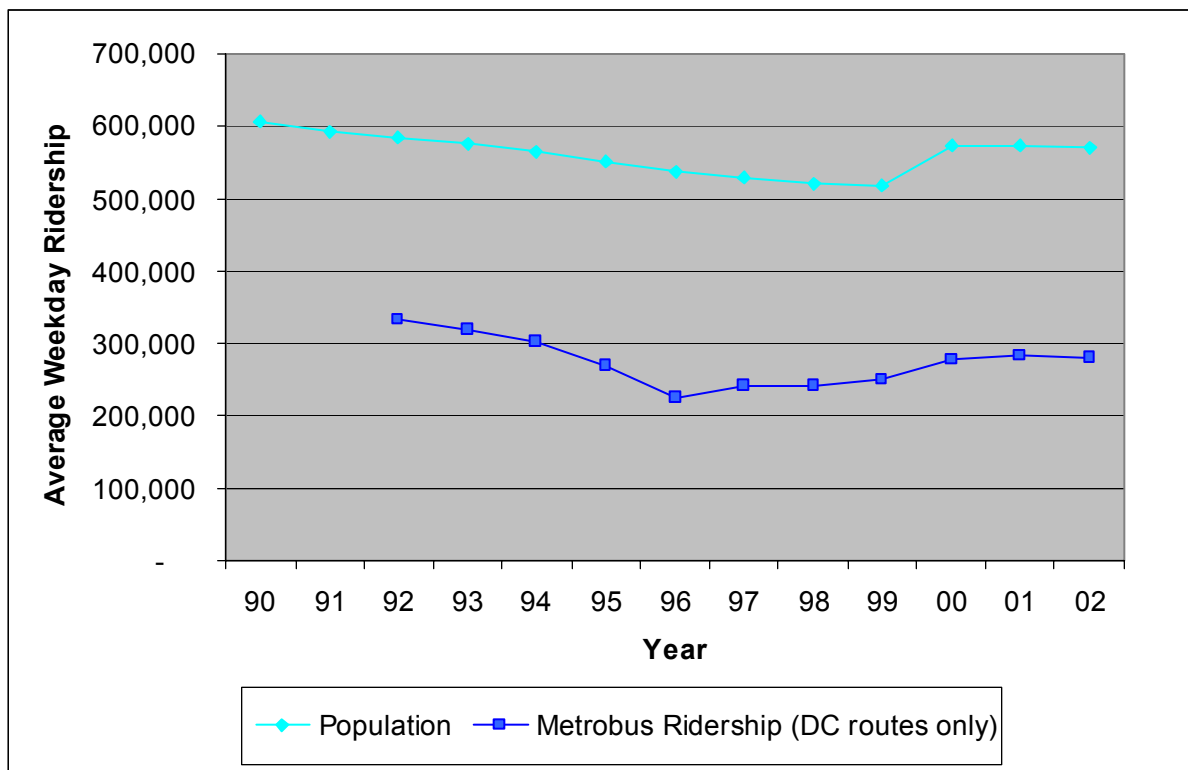
Increasing passenger loads require expanded capacity in order to meet the ridership goals set by the WMATA board. By 2010, the demand exceeding capacity at the maximum load point on all lines will inconvenience passengers by forcing longer wait times and increased delays, while also degrading Metrorail level of service as dwell times increase and rail infrastructure and equipment are continually pushed to (or past) their capacity. As a result of this concern regarding Metrorail demand exceeding Metrorail capacity in the near future, WMATA commissioned the Core Capacity Study to evaluate potential solutions. The Core Capacity Study recommends a number of capital investments to address impending capacity constraints and to provide for future ridership increases.

The focus of the Alternatives Analysis is to focus on additional high quality services in the District, serving areas not directly served by Metro. By increasing the number of alternative services available, WMATA can leverage the existing Metrorail system, optimizing its effectiveness for serving regional trips, while at the same time introducing services to meet local transportation needs more effectively.

Metrobus

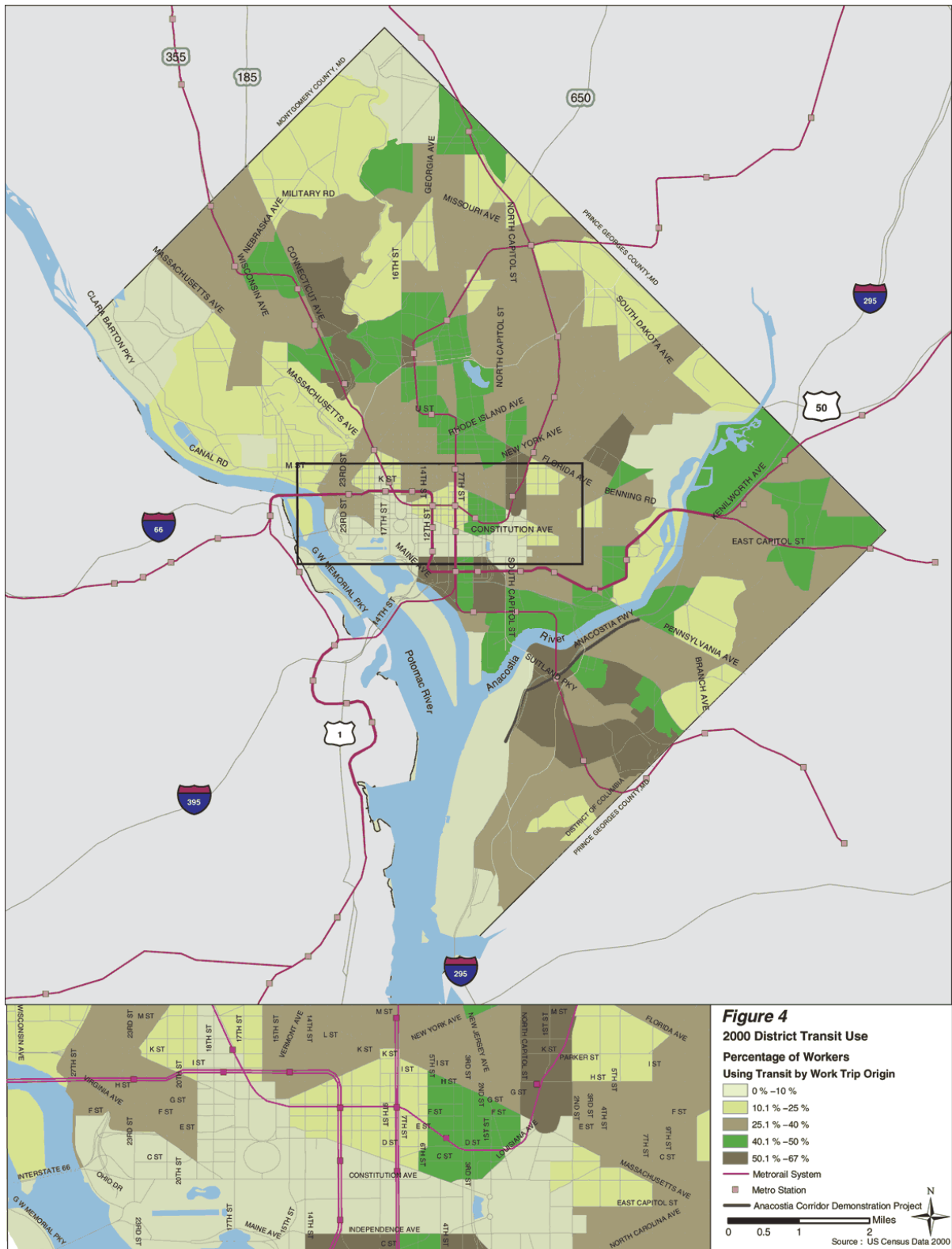
Metrobus serves a critical function in the regional transit network by providing service coverage to the large sections of the city that are not directly served by Metrorail. Furthermore, Metrobus also allows for greater flexibility in meeting transit demand based on the ability to quickly and easily modify frequency, span of service, and coverage of individual routes to adapt to changes in service demand. Like Metrorail, Metrobus ridership closely mirrors population trends. Figure 3 depicts population and ridership trends in the District between 1990 and 2002.

Figure 3
Population and Metrobus Ridership, 1990-2002



The Metrobus system is built around a system of route families. Under this configuration, each route is composed of a main trunk line on which several routes operate. The individual routes are then structured to branch off and collect ridership off of the main line. For example, the X buses travel along H Street (the trunk portion of the line), but the X1, X2, X3, X4, and X5 all have different terminal points at both the origin and destination end of the route. The Metrobus system consists of 344 routes operating on 164 trunk lines. Of these, 28 trunk lines comprised of 66 routes operate within the District. Figure 4 depicts the District's bus trunks by their peak period service headways.

Figure 4
Existing Bus Trunks



Unlike the Metrorail system, Metrobus also provides crosstown service. This service configuration, in conjunction with its more extensive geographic coverage and operational flexibility, allows Metrobus to complement Metrorail service by serving local mobility needs. Table 4 lists the average weekday ridership on the Metrobus routes operating in the District.

In addition, for the purposes of better understanding transit demand and capacity by sector of the city (and thus also for a better understanding of demand by corridor within the city) the city was also broken into sections for analysis purposes. These analysis sectors are:

- Northwest, from the Potomac to Rock Creek Park;
- North, from Rock Creek park to New Hampshire;
- Northeast, from New Hampshire to Benning Road;
- Southeast, southeast of the Anacostia River; and
- Central, between the Anacostia and Potomac Rivers and Florida Avenue, east of Washington Circle.

Table 4 also contains information on routes and demand by city sector. Because some routes extend across two or more subareas of the City, in some cases, they are listed twice.

Table 4
Metrobus Routes Operating in the District of Columbia

Route	Corridor	1996	2000	2002	% change 1996-2002
Northwest					
30-36	Pennsylvania Ave SE./ Wisconsin Ave NW	20,585	24,242	23,264	13%
42	Columbia/Connecticut	9,115	11,053	12,854	41%
D1-D8	Q Street NW/ K Street NE	12,955	15,273	17,516	35%
L1,2,4	Connecticut Avenue	4,745	5,111	5,129	8%
North					
52-54	14 th Street NW	12,534	17,140	19,685	57%
S1,2,4	16 th Street	14,268	17,162	19,991	40%
60-68	New Hampshire/5 th Street NW	10,272	10,336	10,377	1%
70,71	Georgia Avenue/7 th Street	16,136	23,031	21,199	31%
80	North Capitol Street	6,392	8,889	8,819	38%
90,92,93	Woodley/Calvert/U/Florida/8 th	16,789	19,793	19,401	15%
E2,3,4, 6	Military/Missouri	6,692	7,306	8,638	29%
H1-H9	Porter/Park/Columbia/Michigan	10,741	13,223	14,177	32%
Central					
X1,2,3,8,9	H Street	13,358	17,574	19,716	47%
96,97	Woodley/New Jersey/East Capitol	4,951	7,751	7,279	47%
Southeast					

Route	Corridor	1996	2000	2002	% change 1996-2002
A2-A48	Martin Luther King Jr. Ave	15,267	17,923	16,757	9%
U2,5,6,8	Minnesota Avenue	6,760	10,496	13,121	94%
W4,6,8,9	Good Hope/Alabama/Stanton (loop)	7,575	9,499	9,629	27%
30-36	Pennsylvania Ave SE./ Wisconsin Ave NW	20,585	24,242	23,264	13%

Source: WMATA, Bus Service Planning, 2003.

As the data in Table 4 show, ridership has grown on each bus route in the city despite the differences in the mix of transit services available in different sections of the City. This data provides a good understanding of the demand for Metrobus services in the District. To complement the ridership data in Table 4, Table 5 provides an overview of the city's demographic characteristics and their relationship to transit usage, by subarea, while Figure 5 depicts the percentage of workers using transit to commute to work.

Table 5
District Transit Use by Subarea

Subarea	Population	Employment	Population to Jobs Ratio	Total Trips	Population to Trips Ratio	Transit Trips	Transit Mode Share
Northwest	103,807	84,650	1.23	619,818	5.97	84,452	14%
North	111,287	30,734	3.62	328,291	2.95	56,618	17%
Northeast	80,852	53,235	1.52	231,676	2.87	37,361	16%
Southeast	133,907	30,962	4.32	316,738	2.37	48,108	15%
Central	106,644	478,436	0.22	562,319	5.27	123,227	22%

The population to jobs ratio is highest in the North and in the Southeast, meaning that more residents in these areas must leave the sub-area to get to a job, while in the Northwest and the Northeast there are more jobs available closer to home for residents in those areas. This data is one proxy for showing where the greatest need for transportation connections to jobs away from the sector of residence occurs.

Another proxy for transit need is outlined in Figure 6, which shows the number of 0-car households by TAZ as well as transit use by TAZ. This data can also be compared to the transit use data contained in Tables 4 and 5. Despite the distribution and concentration of 0-1 car households in certain parts of the city, transit mode share is greater than 10% in all sections of the City, suggesting that transit is the first choice for many District commuters regardless of their ability to drive. By 2025 the District's population is expected to increase by 24%. Similarly, District employment, already 16 times more dense than anywhere else in the region, is expected to increase by 22% by 2025. The combination of an increase in residents as well as jobs will increase the demand for transit services, especially in corridors that are already experiencing crowding.

Figure 5: Workers Using Transit to Get to Work

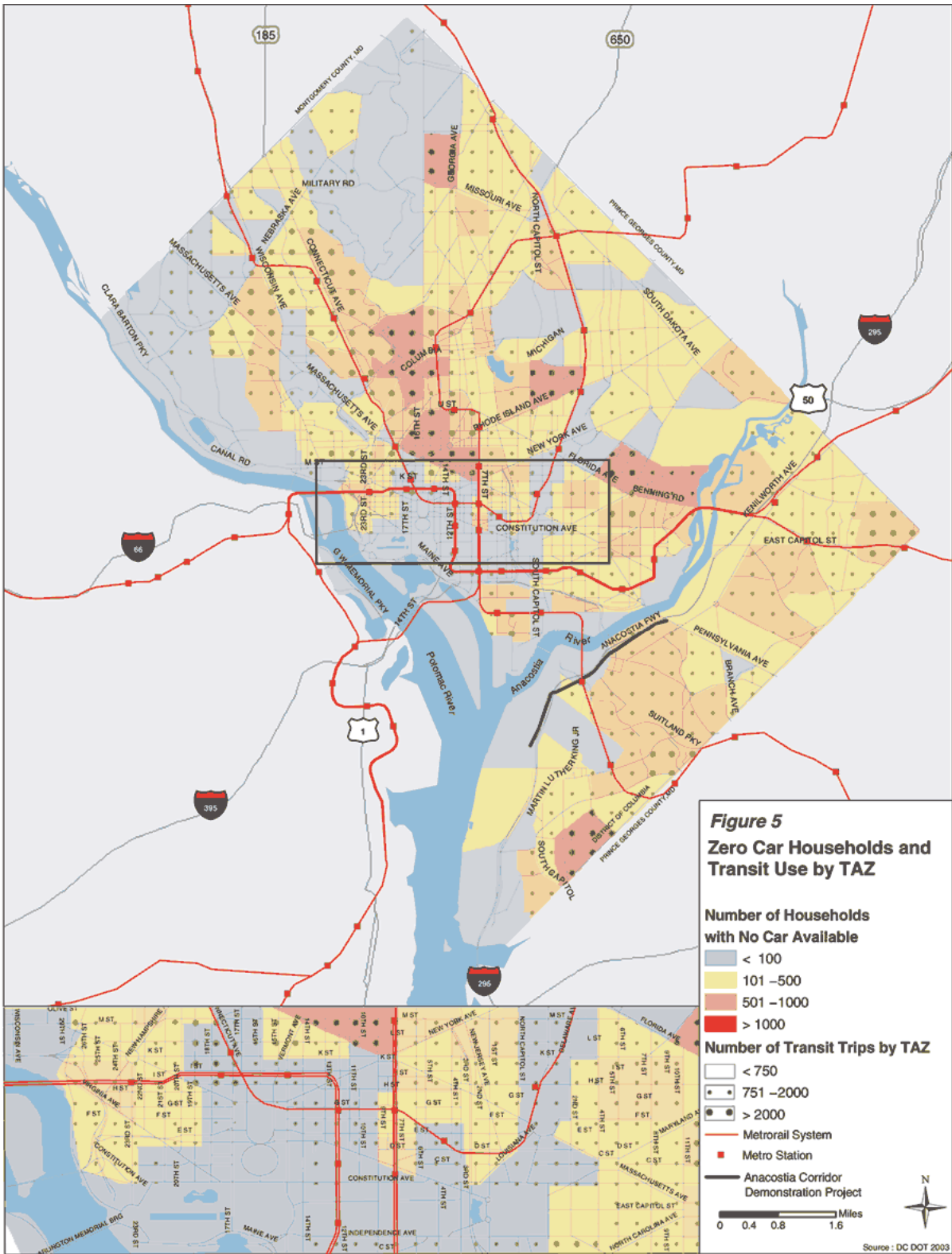


Figure 6: 0-1 car Households and Transit Use by TAZ

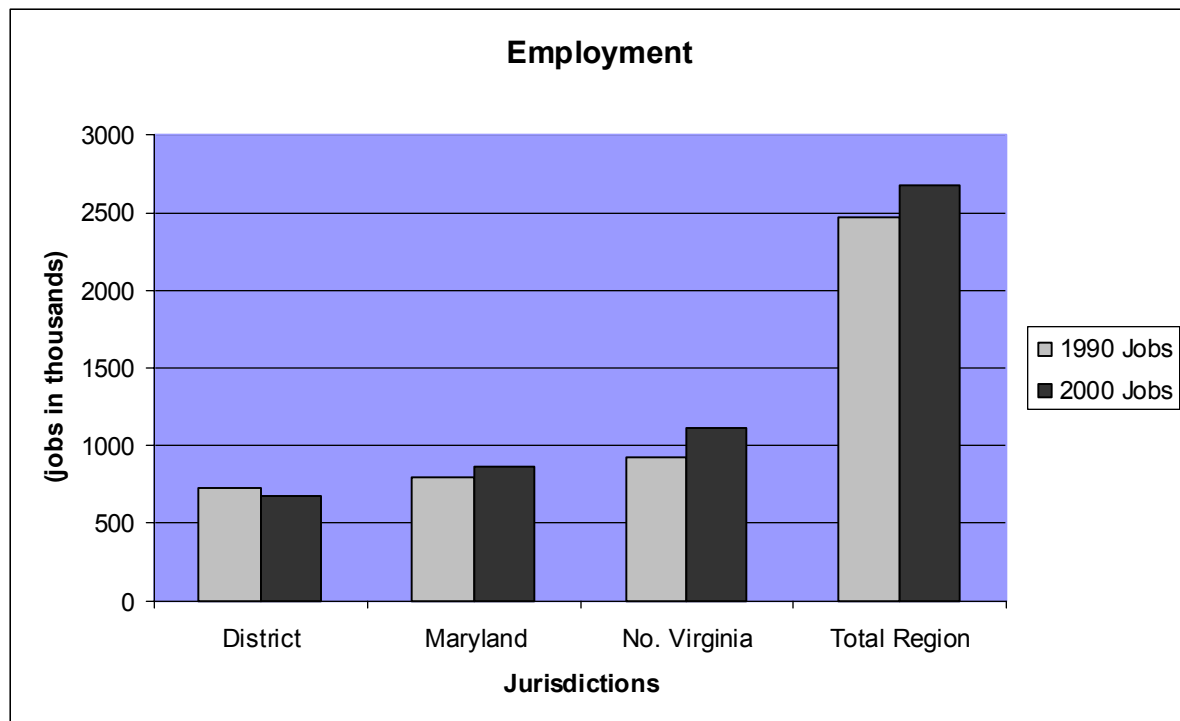
2.3 POPULATION, EMPLOYMENT, AND SPECIAL GENERATORS

This section outlines population and employment characteristics in the District of Columbia, including forecasted changes in these characteristics. These data are essential tools in identifying areas of potential transit need and demand.

2.3.1 Employment

Employment in the Washington DC metropolitan region has grown over the past ten years. However, the majority of this growth has occurred in the Maryland and Virginia suburbs. Figure 5 shows the changes in total employment levels in DC, Maryland and Virginia between 1990 and 2000.

Figure 5
Regional Employment 1990-2000



Source: NPA Data Services for "Housing in the Nation's Capital." Fannie Mae Foundation/Urban Institute, 2002.

Not surprisingly, District employment is not uniform across the city, but rather is concentrated in a few locations. This can be seen in Figure 6, which illustrates 2000 Employment by Traffic Analysis Zone (TAZ.) This trend is further supported by examining the location of the District's Top 200 major employers (as measured by number of employees). As can be seen in Figure 7, these large employers are almost exclusively concentrated in the downtown core, with even greater concentrations around K Street NW. Based on the data shown in Figures 6 and 7, employment concentrations throughout the city occur in the following areas:

Figure 6
2000 District Employment

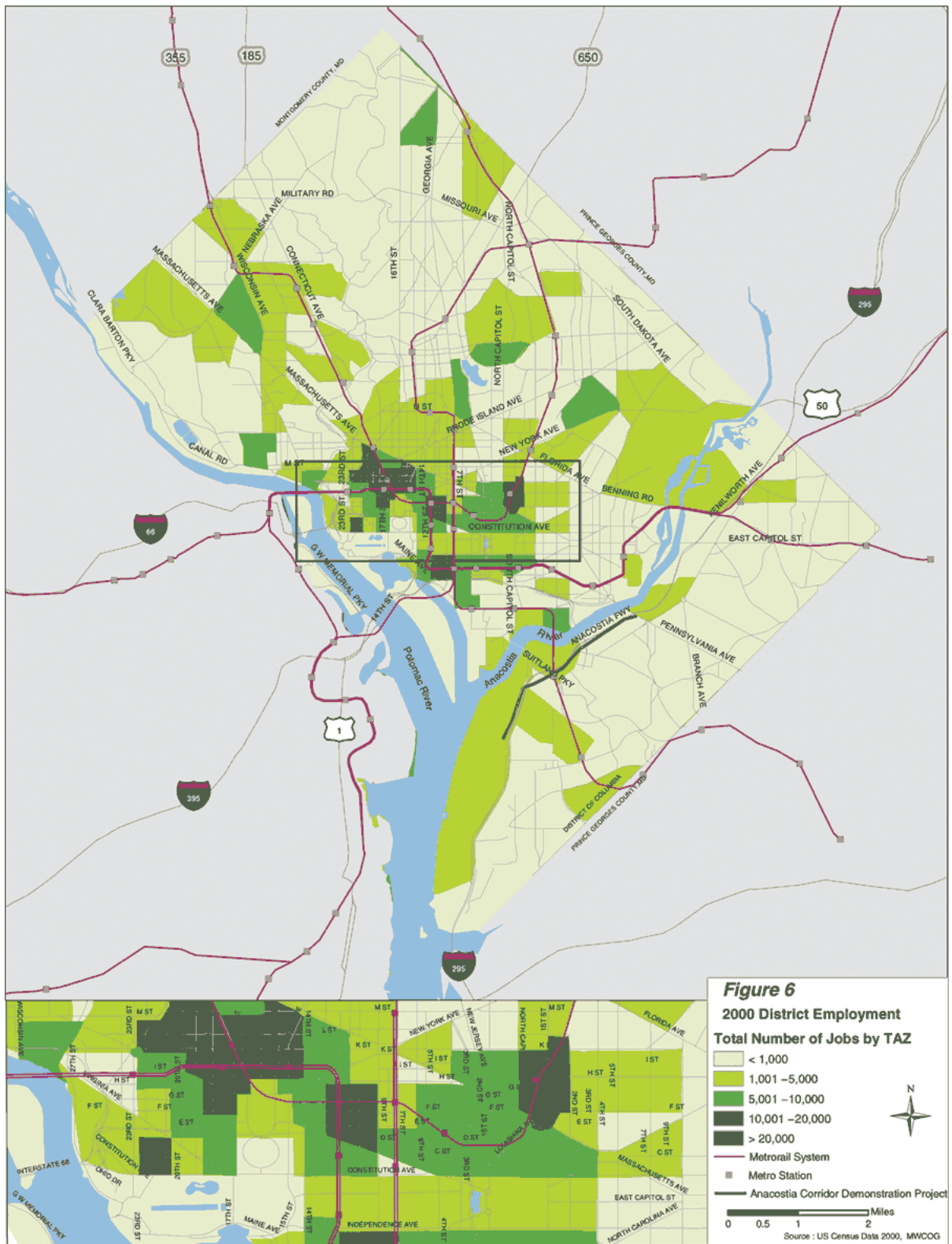
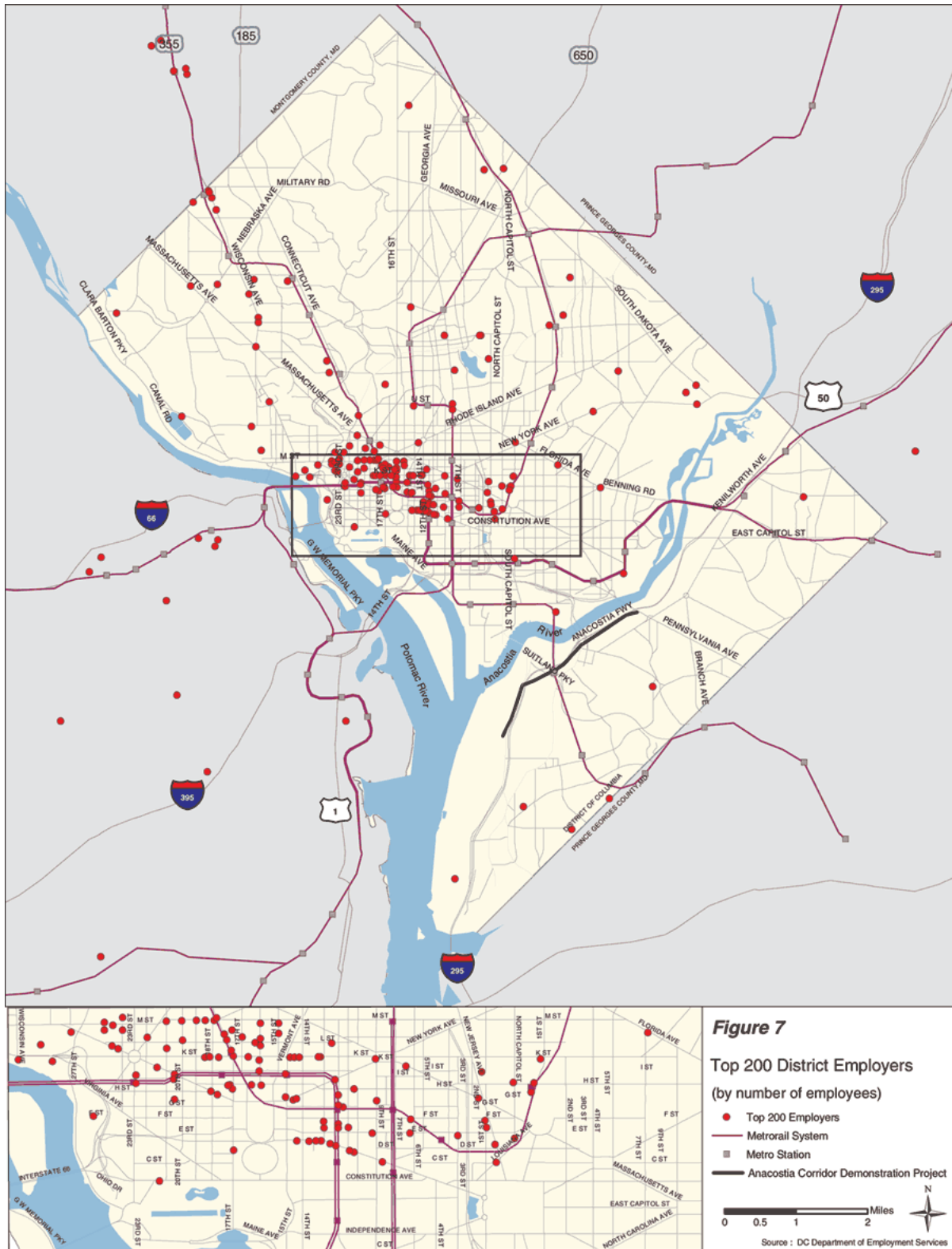


Figure 7
Top 200 Employers in District of Columbia



-
- In downtown DC surrounding the National Mall (dominant relative to rest of city);
 - In northwest DC at Massachusetts Avenue, NW and Nebraska Avenue, NW;
 - Along New York Avenue, NE, immediately north of Massachusetts Ave, NE;
 - From Bladensburg to Rhode Island, NE, north of Florida Ave, NE;
 - Along Connecticut Avenue, NW from downtown to Dupont Circle and again north of Porter; and,
 - Along Georgia Avenue north of Florida (Howard University) and south of Alaska (Walter Reed Hospital).

Although the existing Metrorail and Metrobus systems provides high quality access to some of these employment concentrations (especially downtown), there continues to be a need to maximize District residents' ability to access both local and regional employment opportunities.

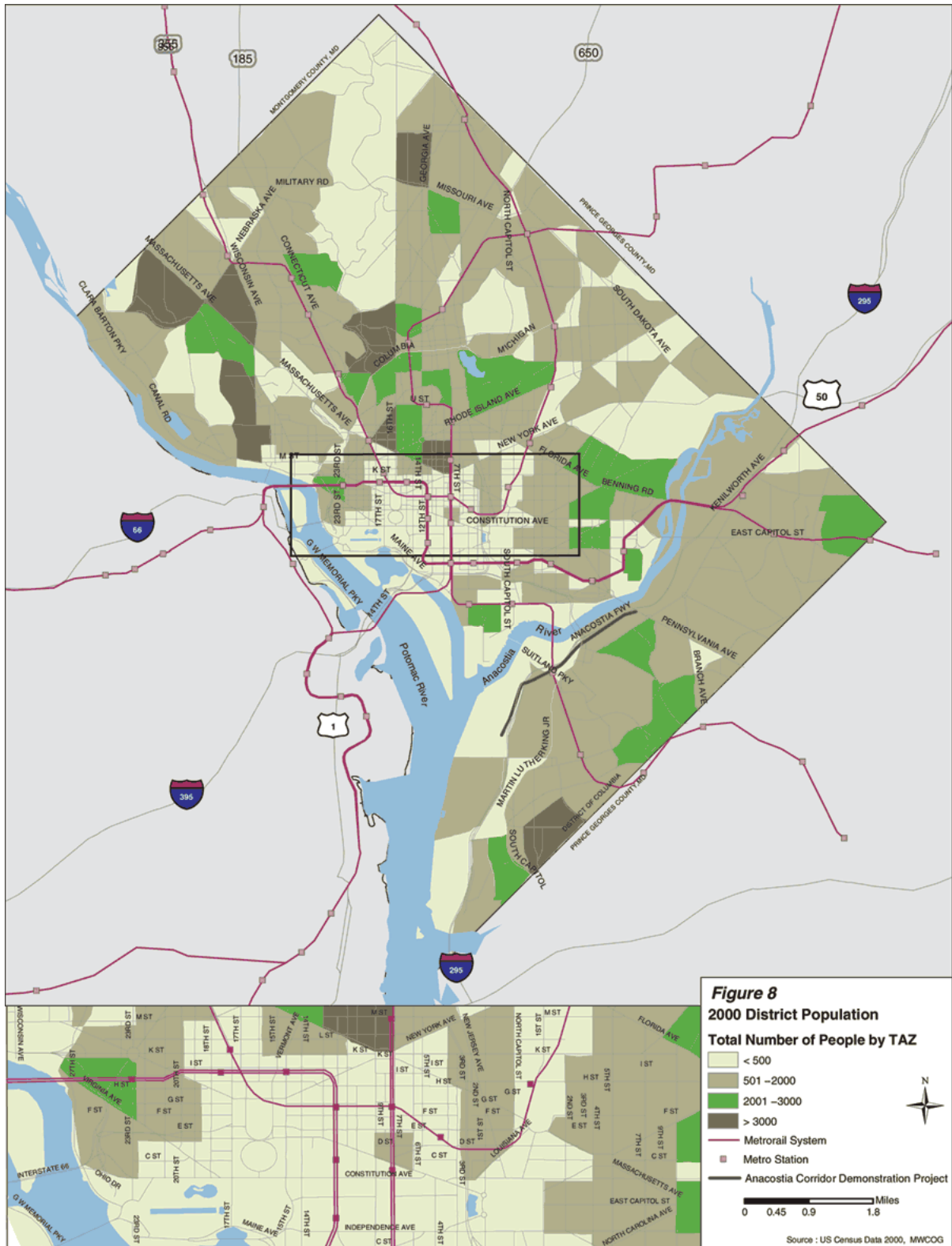
2.3.2 Population

Overall, the District is a densely-populated city. In 2000, 572,000 people lived within the city, with an average density of over 9,000 people per square mile. In 2002, Mayor Anthony Williams set a goal of attracting 100,000 new residents to the District over the next ten years, which would represent an increase of almost 20 percent over the current population.

As shown in Figure 8, the greatest population densities in the District of Columbia are found:

- North of downtown DC in Dupont Circle, Adams Morgan and Cardozo-Shaw;
- West of Wisconsin Ave. NW and Massachusetts Ave. NW in Glover Park and Cathedral Heights;
- Along the Georgia Avenue spine in Brightwood, Takoma, Columbia Heights, and Logan Circle/Shaw;
- East of New York Avenue NE and north of H Street/Benning Road in Trinidad and Carver/Langston; and
- In southeast DC between Wheeler Rd. and South Capitol St. in Washington Highlands and Congress Heights.

Figure 8
District Population



2.3.3 Special Trip Generators

In addition to serving residents, the District's transportation system must also serve a number of special trip generators, including tourist attractions, activity centers, entertainment venues, hospitals and universities. For example, the District of Columbia attracts over 17 million tourists each year. Table 5 lists some of the District's major tourist attractions and the number of visitors they drew in 2002. Figure 10 depicts these tourist destinations as well as the location of other significant special trip generators.

Table 5
List of Major Attractions

Attraction	Annual Visitors	Location	Access by
Chesapeake & Ohio Canal	2,722,021	Lower Northwest	Metrobus/ Tour bus
National Zoo	3,000,000	Upper Northwest	Metrorail
National Cathedral	700,000	Upper Northwest	Metrobus/ Tour bus
Franklin Delano Roosevelt Memorial	2,493,089	Tidal Basin	Tour bus
Frederick Douglas House	39,369	Southeast	Metrobus
Ford's Theater	545,336	Downtown	Metrorail
Washington Monument	500,000	Mall	
Lincoln Memorial	3,551,973	Mall	Tour bus
Smithsonian Museums	24,200,000	Mall	Metrorail/Metrobus

Sources: National Park Service, Public Use Statistics Office, <http://www2.nature.nps.gov/stats/>. Smithsonian Museums and National Zoo: Smithsonian Institute, <http://www.si.edu/about/>

While nearly all major tourist destinations are accessible by transit, few tourists tend to utilize Metrobus services because of a lack of information regarding routings and service frequencies, thus making areas outside of downtown or away from Metrorail effectively inaccessible to visitors wishing to use transit. To facilitate circulation in downtown and the area around the National Mall, WMATA recently completed the "Downtown Circulator Study" to identify the feasibility of a circulator system to provide for short trips within the monumental core, provide for trips within downtown, and to connect downtown and the monumental core. Parts of this circulator system will soon be implemented but additional needs exist to better connect tourists and visitors to District neighborhoods and other destinations outside of downtown.

Figure 10
Special Trip Generators



Hospitals represent tremendous potential ridership markets for transit services. Walter Reed Army Medical Center, located in the northern part of DC along Georgia Avenue, serves more than 1.5 million patients annually; and Washington Hospital Center and the VA Medical Center, located in Northeast DC, serve another 500,000 patients combined. Each of these hospitals is located along Metrobus routes, but, as later sections will indicate, they remain relatively inaccessible by transit for the majority of District residents.

3.0 NEEDS ANALYSIS

The current and future forecasted conditions data presented in the previous section provide an overall understanding of the District of Columbia and its transportation system. This general understanding provides the foundation for the analyses included in this section. The purpose of these analyses is to utilize the current conditions data as well as additional information to more precisely identify areas where there are transit gaps or shortfalls within the District and thus also identify areas of required transit improvements in the city.

As noted in the introduction four specific analyses were completed to identify these transit improvement needs. These include:

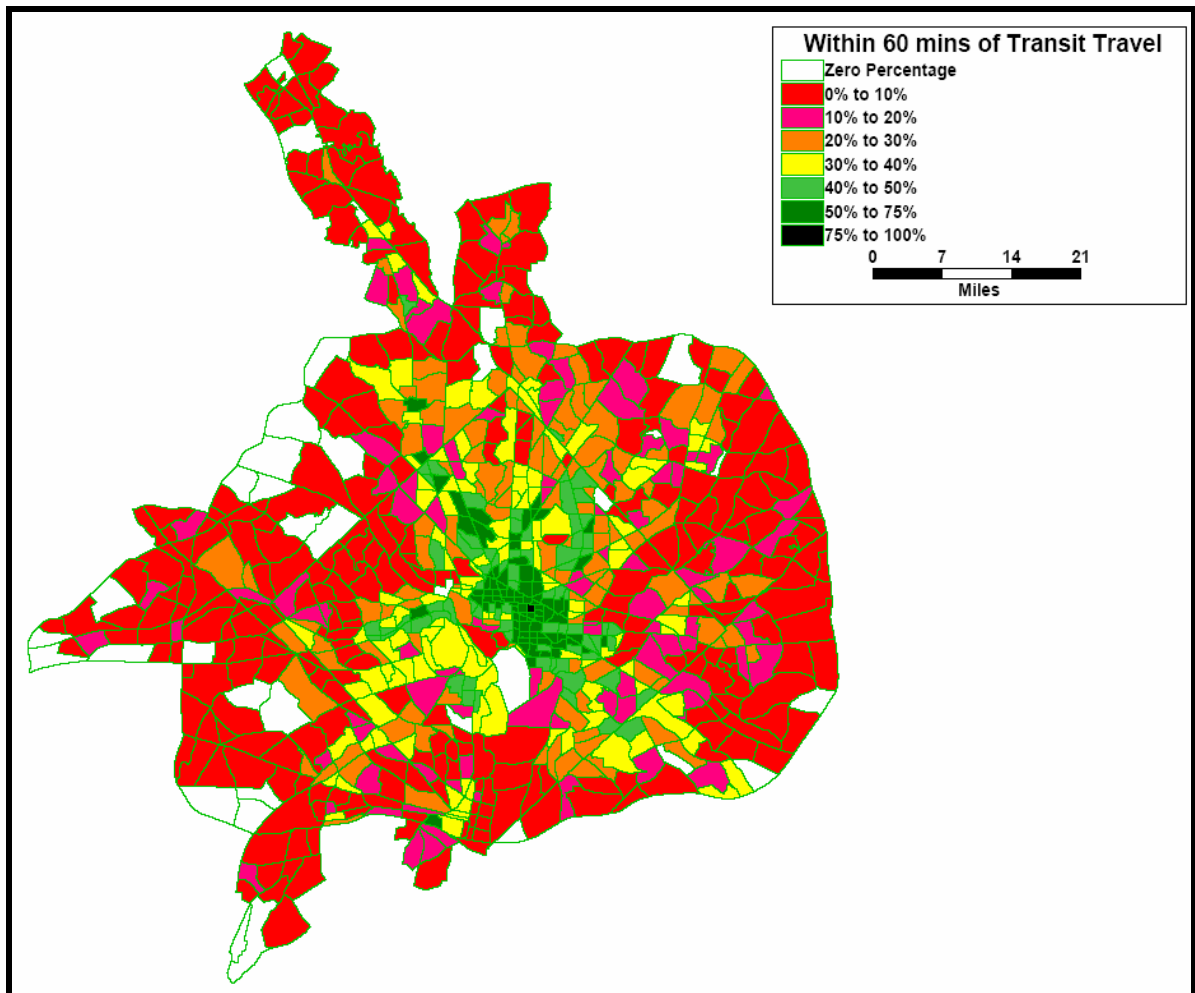
- An assessment of transit travel times to employment and other activity centers for District residents;
- An assessment of overall travel and transit demand in different sections of the city;
- A comparison of transit demand to transit capacity within key corridors in the city; and
- An assessment of development and redevelopment initiatives within the city that will require transit access;

Each of these analyses is described in greater detail below.

3.1 TRANSIT TRAVEL TIMES

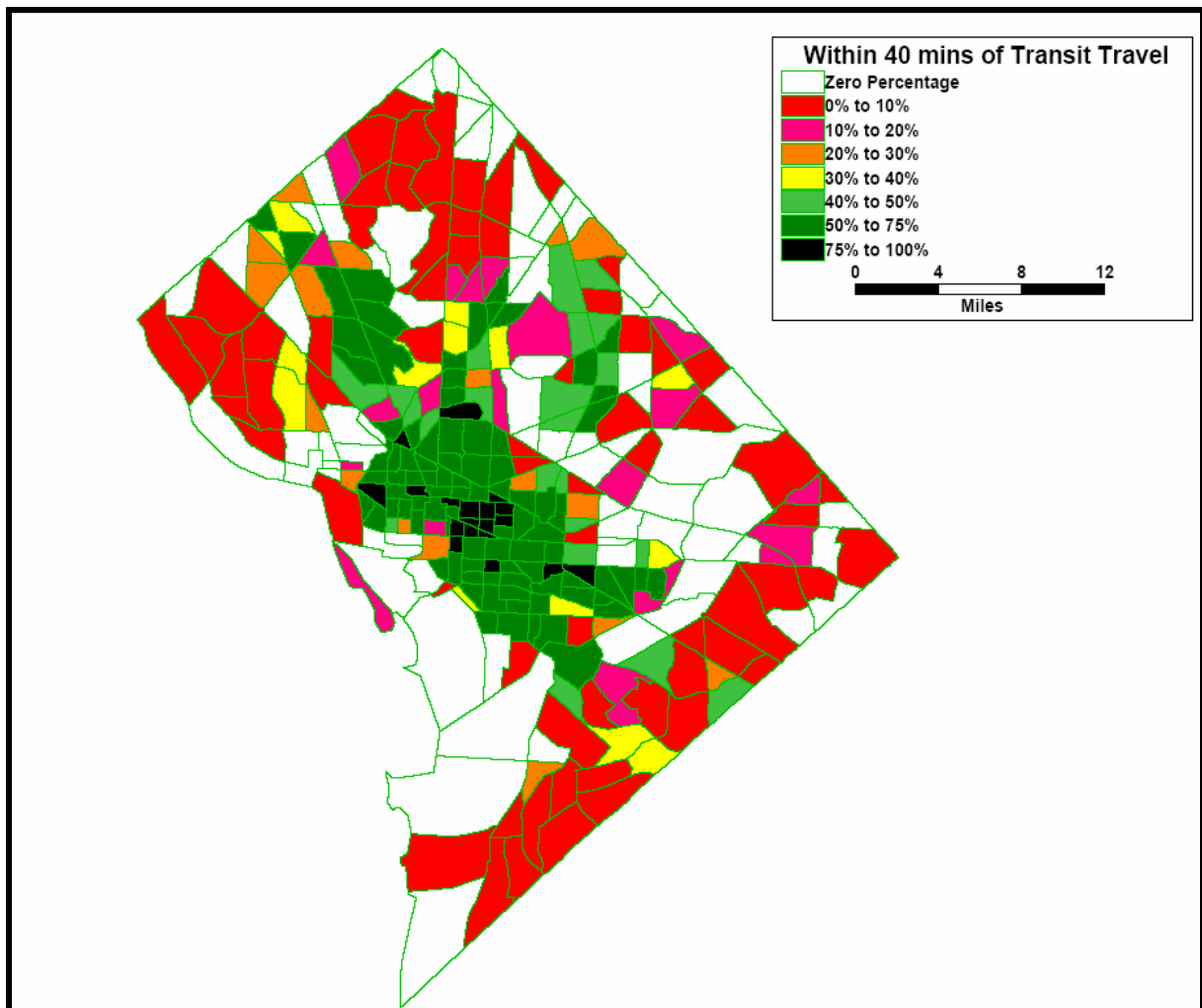
As was shown in Figure 2, the number and mix of transit services varies by section of the City. Consequently, the ability to access employment, services, and recreational and cultural destinations also varies greatly across the City. Figure 11 illustrates, by Traffic Analysis Zone (TAZ), the percentage of regional employment that is accessible within 60 minutes of travel time by transit. Similarly, Figure 12 depicts, by TAZ, the percentage of District employment that is accessible within 40 minutes of travel time by transit. These figures show where transit can effectively compete with the automobile as a viable mobility option. Not surprisingly, the figures show that the areas with the most competitive transit service are located in downtown and along Metrorail lines. The downtown locations have two advantages. First they are next to the largest job concentrations in the city and thus transit trips to these jobs would be a short distance. Second, people have access to the greatest concentration of transit in the city, and thus their transit options are much greater. Locations along Metrorail lines have a similar advantage. Metrorail runs more frequently than other transit services and also has shorter trip times because it does not have to run in mixed traffic. The data in these figures show that in many parts of the city the transit system is not a viable alternative to the automobile and thus these areas are logical candidates for transit improvements.

Figure 11
Access to Regional Employment within 60 minutes*



*Depicts total transit trip time, door to door.

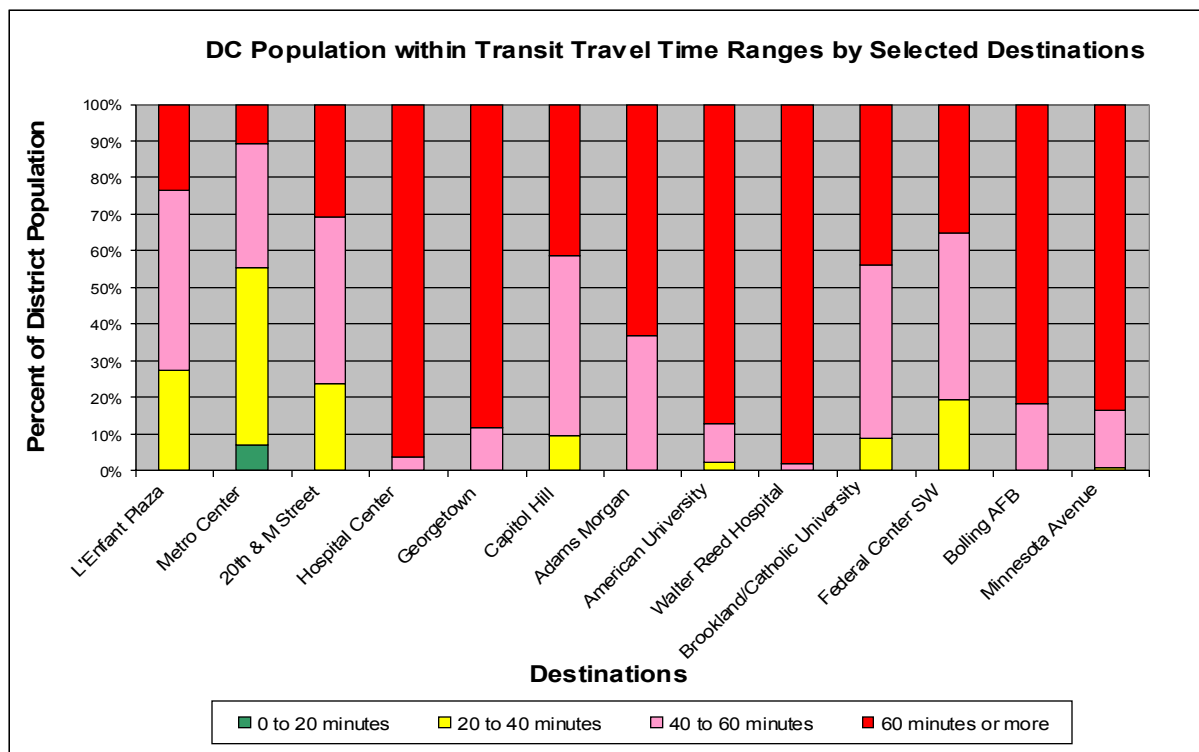
Figure 12
Access to District Employment within 40 minutes*



*Depicts total transit trip time, door to door.

The general regional and citywide data outlined in Figures 11 and 12 are supplemented by the data shown in Figure 13. This figure depicts the percentage of the District's population that can reach selected District locations within different travel time ranges. The locations shown in Figure 13 include the major job concentrations within the District such as Metro Center but also include important activity centers in other parts of the city. This data highlights the data outlined in Figures 11 and 12, and shows that significant parts of the city outside of downtown are not well served by transit. For example, only 12% of District residents can reach Georgetown by transit in less than an hour, and over 95% of the District must plan on spending more than an hour on transit in order to reach Walter Reed Hospital. By contrast, because it is located near a Metrorail station, over 50% of District residents can reach Brookland in less than an hour of transit travel time. Likewise, over 85% of the District is within an hour of Metro Center, and over 50% of the District is within 40 minutes of it. The data outlined in Figure 13 is graphically depicted in maps for each activity center, in Appendix A. These maps clearly show that reaching activity centers outside downtown by transit is quite difficult for large sections of the city and that even reaching downtown from many sections of the city by transit takes an excessively long time.

Figure 13
Population within Travel Time Ranges of Selected Metrorail Stations



3.2 Overall Transit Demand

The results outlined in section 3.1 are one piece of the puzzle in identifying transit improvement needs. The second is trip demand to the same city destinations considered in the travel time analysis. This demand data is represented on a series of maps that are contained in Appendix B. Each Figure actually contains two maps, one showing total travel demand to the selected activity center, and the second showing total transit trips to the location. A number of patterns that point to transit gaps relative to trip demand are evident when examining the maps. These include:

- **Local Trips** – The maps in Appendix B clearly show that the heaviest trip volumes to activity centers, especially those that are not regional job centers such as downtown, come from areas that are relatively close or adjacent to the activity center. One can see this pattern in the maps for all of the activity centers outside downtown. To some degree this pattern can even be seen for Metro Center, where the heaviest trip volumes come from neighborhoods to the northwest of downtown.
- **Cross City/Non-Radial Trips** - Not surprisingly, many of the trips to activity centers lying outside downtown follow cross-city and non-radial patterns, and therefore are not well served by existing transit focused on radial commute trips into downtown.
- **Low Transit Mode Share** – Putting a total trip demand map next to a transit trip demand map provides real insight into how small transit trip demand to the activity centers depicted in the maps is relative to total trip demand. These data points to the fact that there are relatively few transit choices for activity centers located outside downtown.

3.3 Transit Demand to Transit Capacity Comparison

One of the most significant issues in the Metrobus and Metrorail system is excess demand relative to available capacity. This concern is one of the key topics of the 'Metro Matters' analysis completed last year and the 'Core Capacity' Study completed in 2002. It is also one of the driving forces behind this study, as the District of Columbia and WMATA focus on leveraging the Metrorail system and also identifying ways of relieving crowding in high ridership corridors. Three sets of data are presented to provide an understanding of the system's demand/capacity issues. The first is Table 3 from the current conditions section, which shows current and future forecasted crowding conditions on the Metrorail system by line (re-produced below).

Metrorail Vehicle Loading at Maximum Load Points, 2005-2010

Line	Passenger Capacity	Passenger Demand	Capacity Utilization	2005	2006	2007	2008	2009	2010
Red	17,760	15,000	84%	87%	89%	91%	94%	96%	99%
Blue	6,720	5,890	88%	90%	92%	95%	98%	100%	103%
Orange	12,720	10,900	86%	88%	90%	93%	95%	98%	101%
Yellow	6,480	5,670	88%	90%	92%	95%	97%	100%	103%
Green	8,640	7,460	86%	89%	91%	94%	96%	99%	101%

Source: WMATA, Office of Business Planning and Project Development

Note: Utilization conditions above 85% are considered to be highly congested conditions. Passengers can no longer board crowded trains above 100% utilization.

The second piece of data shows demand to capacity on bus lines in major corridors in the city through the use of a load factor. Any load factor over 1.2 in the peak indicates a level of unacceptable crowding, while any load factor over 1.0 in the off-peak or on weekends also exceeds acceptable load standards. As the data shows, a number of the primary corridors in the city have overcrowding issues, and in some cases these are severe.

Table 6 – Bus Load Factors in Major Corridors

Route Numbers	Corridor	Load Factor
30,32,34,35,36	Wisconsin Avenue, Pennsylvania Avenue	1.2 (peak)
X1,X2, X3	H Street, Benning Road	1.34 (peak)
90, 92	U Street, Florida Avenue	1.06 (all day)
70, 71	Georgia Avenue/7 th Street	1.07 (Saturday) 1.39 (Sunday)
H1, H2, H3, H4	Michigan Avenue/Crosstown	1.45 (all day)
A2, A3, A6, A7, A8	Annacostia/Congress Heights	1.26 (all day)
52,53,54	14 th Street	1.3 (peak) 1.45 (all day)
D1, D3, D6	Sibley Hospital/Stadium Armory	1.06 (all day) 1.35 (Saturday)
42	Mount Pleasant Line	1.41 (all day)
S2, S4	16 th Street Line	(1.41 (peak)

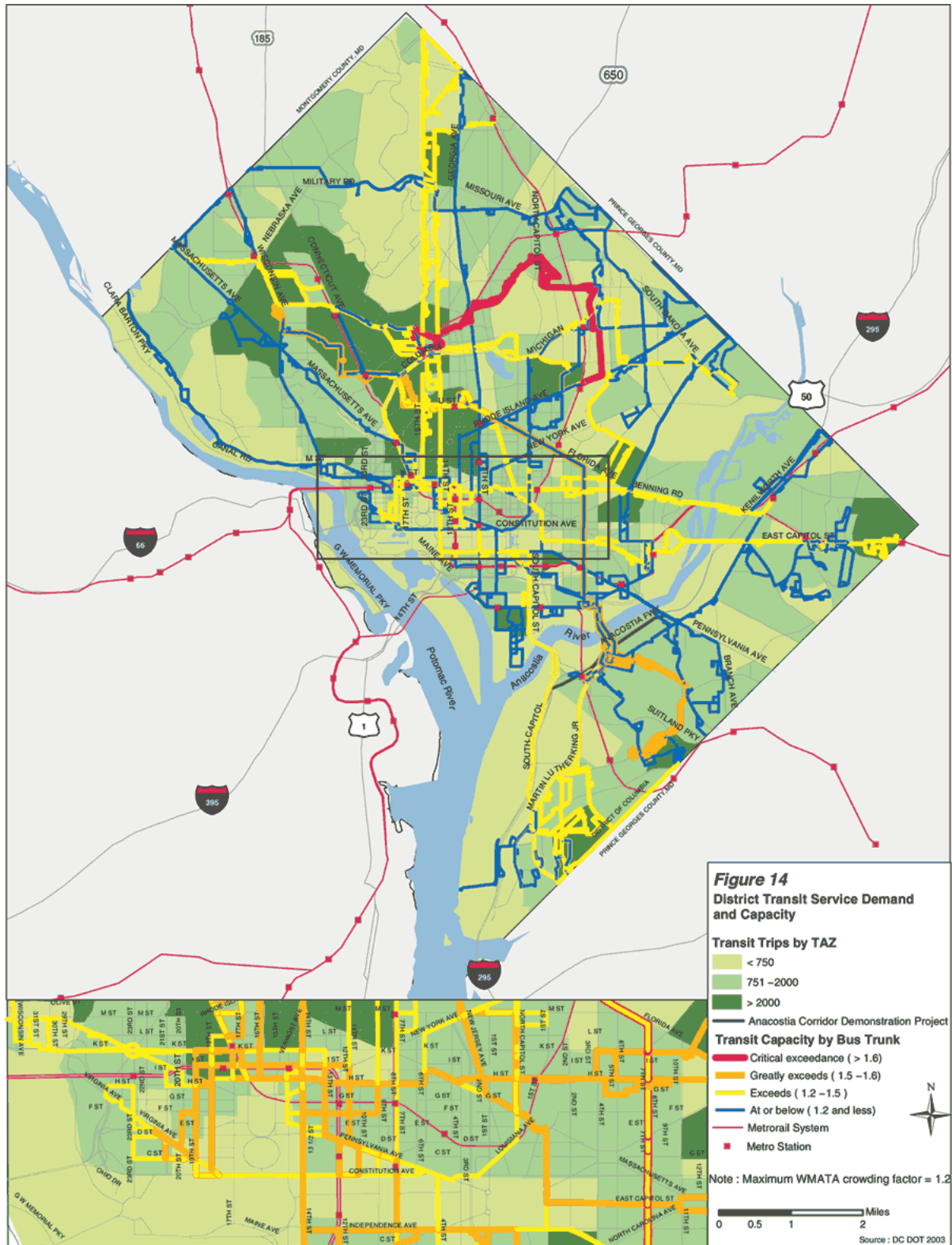
Source: Regional Bus Study Comprehensive Operations Analysis

The final piece of data analyzing demand to capacity is Table 3 in Appendix B. This data is a rough estimate of transit demand for trips from each sector of the city to each of the key activity centers considered in the travel time and overall demand analysis, compared to a rough estimate of transit capacity for direct trips for the same O/D pairs. Not surprisingly, demand exceeds capacity for a number of the outlying activity centers, especially for cross city trips. This data does not necessarily imply high demand but rather nearly non-existent direct capacity for trips between two outlying points in the city. Figure 14 provides a general overview of transit trip origins and bus trunk line capacities.

Some specific findings of the data in Appendix B and Figure 14 include:

- For some destinations, such as Adams Morgan and the Hospital Center, direct trip transit capacity is inadequate to meet the demand: there is 9 times greater demand than capacity to Adams Morgan and over 5 times greater demand than capacity to the Hospital Center. However, by City sub-area, capacity is especially lacking from the Northwest to Adams Morgan, whereas it is lacking from both the northwest and central sub-areas to the Hospital Center.

Figure 14
District Transit Passenger Demand



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- In the Northwest, there is significant demand for destinations within the Northwest sub-area, (Northwest to Adams Morgan, Northwest to Georgetown and Northwest to American University). However, most of the transit services available are oriented to serve the downtown core.
 - In the North, there is a need for greater capacity to Walter Reed, but, more significantly, there is a need for a crosstown service to connect Walter Reed to District residents living anywhere other than the Northern sub-area and the Central core.
 - Similarly, although the Northeast is served by portions of the Red and Green lines, it could benefit from additional capacity from the Northwest and Central sub-areas, as well as from the introduction of direct service from the North.
 - The existing service configuration forces transfers for most trips starting in the Southeast with destinations outside the Central core, but there are also additional capacity needs within the Southeast and Central sub-areas.
 - Even the Central core varies in terms of service availability and capacity. There are significant capacity needs for residents in the Northwest and Southeast traveling to Metro Center. However, there is three times the demand to the capacity to L'Enfant Plaza from within the Central Sub-area, and going to Capitol Hill forces transfers from any sub-area other than the Central and Northwest sub-areas. Finally, even from the Central Core, which has the greatest amount of converging services, the Hospital Center and Walter Reed have eleven time and three times (respectively) the demand for service than the capacity to accommodate it.

3.4 Planned Development and Redevelopment Projects

The District Office of Planning has targeted ten neighborhoods for redevelopment projects throughout the City. In addition, it has redevelopment plans for three campuses, and it has targeted four broad geographic areas for intensive and coordinated planning project activity. Figure 15 illustrates the development project locations throughout the District, in relation to the originally-designated activity centers that were identified in 1997. In many cases, the current planning efforts have consolidated former individual project areas into larger planning and project areas.

In the Northwest between the Potomac River and Rock Creek Park, redevelopment projects have been planned for American University, George Washington University, Georgetown University and Friendship Heights. Georgetown University is the only project area in the Northwest that is served by Metrobus and not by Metrorail.

In the North between Rock Creek Park and New Hampshire Avenue, development projects are planned around Takoma Park, along Georgia Avenue and in Columbia Heights. Georgia Avenue is currently served by Metrobus only north of Columbia Heights—the other two project locations have Metrobus and Metrorail service.

The Northeast part of the District between New Hampshire Avenue and East Capitol Street has the greatest number of redevelopment projects being proposed and the least coverage by both Metrorail and Metrobus services. Project areas include: McMillan Reservoir, the Ivy City and Trinidad neighborhoods, and the North of Massachusetts Avenue (NOMA) project. Redevelopment efforts have also been proposed adjacent to the infill Metrorail Station at New York Avenue, which is scheduled to open in 2005.

In the downtown core, the Downtown Action Agenda and the convention center redevelopment plans have enveloped the redevelopment and construction around Mt. Vernon Square and Penn Quarter, and will continue to drive development in and around the downtown District north of the National Mall.

The Anacostia Waterfront Initiative will redevelop land adjoining the north and south banks of the Anacostia River, with a mixture of civic, commercial and residential improvements. It is also part of the Southeast large area plan, which envelopes the Poplar Point Plan, Anacostia Gateway, Minnesota-Benning and St. Elizabeth's Plan.

The Main Streets Initiative is a competitive grant program designed to offset the costs of development by helping to fund infrastructure improvements in neighborhood redevelopment areas. Communities competing for Main Streets grants must designate a street within their community as a viable commercial corridor that could benefit from a range of infrastructure improvements. Similarly, neighborhoods also develop Strategic Neighborhood Investment Plans. These SNIP's are intended to be master plans for full blocks or other intra-neighborhood areas that could benefit from active implementation of a plan to transform key neighborhood-oriented locations.

Finally, the DC Marketing Center is a non-profit corporation that works to promote underdeveloped parcels within the District of Columbia. It lists buildings that are already complete but not yet fully leased; historic and/or formerly-developed sites that have fallen into disrepair as well as parcels of raw ground. In some cases, the parcels are controlled by the City; in other cases they are privately held, but have captured municipal interest for further development.

Figure 15 outlines planned redevelopment projects in the city. Figure 16 illustrates the locations of the Main Streets, SNIP sites and parcels being marketed by the DC Marketing Center.

Figure 15
Planned Redevelopment Projects

